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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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23973 7590 08/01/2007 DRINKER BIDDLE & REATH ATTN: INTELLECTUAL PROPERTY GROUP ONE LOGAN SQUARE 18TH AND CHERRY STREETS PHILADELPHIA, PA 19103-6996			EXAMINER JACOB, MARY C	
			ART UNIT 2123	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/506,396	Applicant(s) CAMPBELL, ROBERT	
	Examiner Mary C. Jacob	Art Unit 2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The response filed on 5/25/07 has been received and considered. Claims 25-48 are presented for examination.

Drawings

2. The objections to the drawings recited in the Office Action dated 12/22/06 have been withdrawn in view of the amendments to the specification filed 5/25/07.

Specification

3. The objections to the specification recited in the Office Action dated 12/22/06 have been withdrawn in view of the amendments to the specification filed 5/25/07.

Claim Objections

4. The objections to the claims recited in the Office Action dated 12/22/06 and not repeated below have been withdrawn in view of the amendments to the claims filed 5/25/07.
5. Claims 25, 30 and 32 are objected to because of the following informalities. Appropriate correction is required.
6. Claim 25, step iv recites the following step, "analyzing the structure, using the computer model of the structure...". While it has been interpreted by the examiner that "analyzing the structure" is done by a computer simulation that uses the computer model (see specification, page 5, lines 16-19; page 11, lines 13-16; page 13, lines 29- page 14, line 2), the claim can be interpreted such that the "analyzing" is simply done by

someone visually studying the computer model and performing a mental analysis. It is suggested that the claim language be revised for clarity.

7. Claim 30 recites the step xiv, however, it depends on Claim 28 which recites the steps of x, xi and xii. Therefore, it appears that step xiii is missing. It is noted that Claim 29 recites a step of xiii, however, this step will not be included when interpreting how the limitations of Claim 30 further limit the limitations of Claim 28.

8. Claim 32 is labeled "Previously Presented", however, line 2 of the claim has been amended. It is requested that this claim be re-labeled "Currently Amended".

Claim Rejections - 35 USC § 112

9. The rejections of the claims under 35 U.S.C. 112, second paragraph, recited in the Office Action dated 12/22/06 and not repeated below have been withdrawn in view of the amendments to the claims filed 5/25/07.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 25-37, 46-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

12. Claim 25, step (ii) recites "creating a computer model of the structure using the data *relating to* the initial dimensions of the structure". The use of the term "relating to" indicates that the model is created with data that has some relation to the dimensions of the structure, but is not necessarily the *dimensions* of the structure. Step (vi) updates

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the computer model using *measured dimensions* of the structure. Therefore, it is unclear how the computer model can be updated using measured dimensions if the computer model was created using data that is *related to* dimensions. The data *relating to* the dimensions and the measured dimensions may represent different data and may possibly be in a different form (for example, units of measure).

13. Claim 28, step xii is incomplete. It is unclear what, if any, value is intended to be updated in this step.

14. Claim 46 recites the following: "Structure, such as a plant, comprising a processing arrangement according to claim 38...", it is unclear what the meaning of this limitation is. First, the recitation of "Structure" as the first word of the claim raises questions as to whether this is a new recitation of a structure, or the same recitation of a structure disclosed in Claim 38. Also, this recitation of "Structure....comprising a processing arrangement" makes the claim read as if the "Structure" itself is being claimed. The specification describes a structure being some kind of physical structure such as a vessel; therefore, the claim language appears to be claiming this physical structure, such as a vessel, that includes the processing arrangement that is defined in claim 38.

Claim Rejections - 35 USC § 101

15. The rejections of the claims under 35 U.S.C. 101, recited in the Office Action dated 12/22/06, have been withdrawn in view of the amendment to Claim 25 and in view of further consideration of the specification that adequately recites the "value"

representing the "integrity of the structure" to have a concrete, useful and tangible result (see specification, page 5, line 24-page 6, line3).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 25-33, 38-40, 42-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al (US Patent 4,480,480) in view of Palusamy et al (EP Patent Application Number 0358994).

18. As to Claims 25 and 38, Scott et al teaches: a method for assessing the integrity of a structure, comprising the steps of: placing the initial characteristics of a structure that it is new and unfatigued in memory, and processing means including algorithms to calculate values for these same characteristics from measured data and then compare the initial and values from actual values obtained from measured data, thereby creating a computer model for a structure using the data relating to the initial dimensions of the structure (column 11, line 66-column 12, line 1; Figure 4), using data relating to an estimated load the structure is designed for (column 10, line 20) and data obtained from real-time measurements of the actual load on the aircraft (column 10, lines 14-23; column 14, lines 35-46) to continuously monitor the differences between the real-time measured data and the initial data caused by changing physical dimensions in the

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structure in the computer to continuously re-analyze the structure calculate values for the integrity of the structure (column 2, lines 13-37; column 5, lines 64-68; column 11, lines 61-column 12, line 7) by accessing the remaining fatigue lifetime of an airframe, warning of impending failure of the airframe due to loads which approach or exceed the designed loads, warning of impending engine failure and directly measuring the compliance of structural members subjected to known loads (column 10, lines 12-23), defining areas which are subjected to high stress (column 21, lines 31-38, lines 68); wherein the processing arrangement is provided with sensors to measure data and transmit the data in real-time and receiving means to analyze the data and update the calculations regarding integrity of the structure (Figure 4 and description; column 10, lines 9-23).

19. Scott et al does not expressly teach measuring the dimensions of an area in high stress areas and updating the computer model using the results of measuring the dimensions of the structure in high stress areas instead of or in addition to the data relating to the initial dimensions of the structure.

20. Palusamy et al (EP Patent Application Number 0358994) teaches a method to enable the management of massive amounts of data collected during corrosion-erosion monitoring of piping systems that allows for the automatic evaluation of inspection data to produce an assessment of the containment integrity of a component of a pipe system (column 1, lines 34-49), wherein potential weak points in the piping system are located (column 2, lines 34-36), and data relating to a component's location, pipe size and structure among other data are input to the system (column 2, line 52-column 3, line 3),

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determining where the wall thickness of the components will be measured (column 3, lines 12-39), inspecting the components and acquiring inspection data (column 3, lines 50-53), evaluating the pipe wall integrity through the calculation of stress on a component and on present pipe size and structure of the component (column 4, line 52-column 5, line 6), and providing two dimensional and three dimensional plots to show a graphical representation of corrosion-erosion within a component (column 5, lines 50-55).

21. Scott et al and Palusamy et al are analogous art since they are both directed to the real-time monitoring of the structural integrity of a component in a system.

22. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the collection of data relating to the load and stress on a structure and calculating a value of structural integrity based on this data as taught in Scott et al to further include the measurement of dimensions of a structure as taught in Palusamy et al since Palusamy et al teaches a method to enable the management of massive amounts of data collected during corrosion-erosion monitoring of a system such as a piping systems that allows for the automatic evaluation of inspection data to produce an assessment of the containment integrity of components in a system such as a pipe system (column 1, lines 34-49).

23. As to Claim 26, Scott et al in view of Palusamy et al teach: wherein the method comprises the step of: viii) repeating one or more times steps v), vi) and vii) (Scott et al: column 10, lines 9-23).

24. As to Claims 27 and 39, Scott et al in view of Palusamy et al teach: ix) visualizing the value calculated in step vii) (Scott et al: column 6, lines 44-52; column 10, lines 52-62).

25. As to Claim 28, Scott et al in view of Palusamy et al teach: x) measuring an actual load on the structure, xi) updating the data relating to the load on the structure, and thereafter xii) re-analyzing the structure, using the computer model and the updated load data, in order to calculate a value for the integrity of the structure (Scott et al: column 10, lines 9-23; column 14, lines 13-46).

26. As to Claim 29, Scott et al in view of Palusamy et al teach: xiii) repeating one or more times steps x), xi) and xii) (Scott et al: column 10, lines 9-23; column 14, lines 13-46).

27. As to Claim 30, Scott et al in view of Palusamy et al teach: the step of: xiv) visualizing the results of step xii) (Scott et al: column 6, lines 44-52; column 10, lines 52-62).

28. As to Claim 31, Scott et al in view of Palusamy et al teach: wherein the method comprises the step of installing, after step iv), in high stress areas, a set of sensors for measuring the dimensions of the structure in said high stress areas (Palusamy et al: column 2, lines 34-42; column 3, lines 12-25).

29. As to Claim 32, Scott et al in view of Palusamy et al teach: installing sensors for measuring the load on the structure in said high stress areas (Scott et al: column 16, line 21; column 17, lines 30-32; column 21, lines 50-52).

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30. As to Claim 33 Scott et al in view of Palusamy et al teach: connecting the sensors to a processing means, such as a computer, for transmitting data from the sensors to the processing means in real time (Scott et al: Figure 4; column 6, lines 20-39; column 10, lines 9-14).

31. As to Claim 40, Scott et al in view of Palusamy et al teach: wherein the sensors are adapted to measure pressure exerted on the structure (Scott et al: column 6, lines 65-68; column 8, lines 3-16).

32. As to Claim 42, Scott et al in view of Palusamy et al teach: wherein the sensors are adapted to measure mechanical loading on the structure (Scott et al: column 7, lines 12-14; column 14, lines 13-39).

33. As to Claim 43, Scott et al in view of Palusamy et al teach: wherein the sensors are adapted to measure fluid loading on the structure (Scott et al: column 19, lines 4-8, 44-46; column 20, lines 19-27, wherein sensors measure wave loading on an offshore platform structure and the loading on an ocean going vessel wherein it is understood that the loading on the vessel would include the weight on the structure and the pressure exerted on the structure from the surrounding water).

34. As to Claim 44, Scott et al in view of Palusamy et al teach: wherein the sensors are adapted to measure vibration (Scott et al: column 9, lines 35-39; column 13, line 19-column 14, line 12).

35. As to Claim 45, Scott et al in view of Palusamy et al teach: wherein the sensors are adapted to measure acceleration experienced by the structure (Scott et al: column 6, lines 65-68; column 7, lines 57-68).

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36. As to Claim 46, Scott et al in view of Palusamy et al teach: a structure, such as a plant, comprising a processing arrangement according to claim 38 for accessing an integrity of the structure (Palusamy et al: column 1, lines 1-5; column 2, lines 18-30).

37. As to Claims 47 and 48, Scott et al in view of Palusamy et al teach: A computer program product comprising data and instructions that after being loaded by a processing arrangement provides said arrangement with the capacity to carry out a method according to claim 25, a data carrier provided with a computer program product according to claim 47 (Scott et al: Figure 4, column 6, lines 13-56; Palusamy et al: Figure 1).

38. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al in view of Palusamy et al as applied to claim 38 above, and further in view of Zachary et al (US Patent 5,867,977).

39. Scott et al in view of Palusamy et al teach sensors for measuring pressures and loadings on a structure for an assessment of the structural integrity of a structure.

40. Scott et al in view of Palusamy et al do not expressly teach the sensors measured to measure temperature.

41. Zachary et al teaches a method for preserving the structural integrity of a gas turbine through a system that monitors the temperature of a working fluid with at least one temperature sensor (Abstract; column 20, lines 50-58).

42. Scott et al in view of Palusamy et al and Zachary et al are analogous art since they are all directed to the assessment of the structural integrity of a system.

43. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the measurement of pressures and loadings on a structure as taught by Scott et al in view of Palusamy et al to further include sensors to measure temperature as taught in Zachary et al since Zachary et al shows that it is known in the art that temperature could be measured with sensors for the assessment and preservation of the structural integrity of a system (Abstract; column 20, lines 50-58).

Response to Arguments

44. Applicant's arguments filed 5/25/07 have been fully considered but they are not persuasive.

45. As to the limitations cited in Claims 25 and 38, Applicant recites, "At a later time, dimensions of the identified highly stressed areas are measured anew. The model is updated using the new measurements..." (page 8). It is noted that step (i) of claim 25 recites, "collecting data *relating to* the initial dimensions of the structure". The computer model is created using this data that "relates to" the initial dimensions of the structure in step (ii). This recitation of "relating to initial dimensions" does not appear to be limiting to the actual dimensions of a structure (for example: length, width), but appears to recite any data that has some *relation to* the initial dimensions of a structure. Scott et al recites the use of a distinct set of natural frequencies and a well defined impulse response for the initial, unfatigued structure, that will change when the physical dimensions of the structure change (column 11, lines 61-column 12, line 7). This data recited in Scott et al, the set of natural frequencies and impulse response for a structure, is considered to

encompass data *relating to* initial dimensions of the structure since the changing of the impulse response will signal a change in the physical dimensions of the structure; therefore, it "relates to" the dimensions of the structure. Further, because the computer model is created instep (ii) using data *relating to* initial dimensions of the structure, it is unclear how the actual measured dimensions of the structure can be used to update the model if the data used to create the model is of a different form as the data being used to update the model (see 112, second paragraph rejections above).

46. Applicant argues, "Scott does not disclose creating a computer model of the structure, as required by applicant's claims 25 and 38" (page 8).

Scott et al teaches: "Each structure will have a distinct set of natural frequencies and a well-defined impulse response when the structure is new, unfatigued and has no existing cracks" (column 11, line 66-column 12, line 1). This set of equations for each structure is considered a mathematical model for the structure that is implemented in the computer system disclosed by Scott et al to continuously determine changes to the physical dimensions of the structure that occur (column 11, line 61-column 12, line 7).

47. Applicant argues, "Scott does not analyze the structure using estimated load data to define areas which are subject to high stress. At most, the passages at col. 10, lines 14-23 and col. 14, lines 35-46 cited in the office action describes real-time monitoring of an actual load in comparison to a design load (not an estimated load)" (pages 8-9).

Scott et al discloses analyzing the structure and warning of impending failure of the airframe due to loads that approach or exceed the design loads (load measurement) by directly measuring the compliance of structural members subjected to known loads

(column 10, lines 12-23) and further, teaches defining areas which are subjected to high stress (column 21, lines 31-38 and 67-68). The "design load" is considered to be the estimated load that the structure is designed to withstand. It is understood that when the loads approach or exceed this designed load, failure will occur in the structure because of the loads applied at particular places in the structure. The system taught in Scott is used to define the areas where these failures happen due to the high stress on the system. For example, the location of cracks in pipes, taught by Scott et al (column 21, 31-38, 67-68) disclose locating areas of high stress since it is understood that cracks in the pipe will occur due to high stress in that particular area. It is noted that the specification does not give a specific definition for the terms "relatively high stress" or "high stress", therefore, these terms were given the broadest reasonable interpretation.

48. Applicant argues, "The examiner concedes that Scott does not teach re-measuring the dimensions in areas of high stress, updating a computer model, and re-analyzing the updated computer model. The examiner cites to Palusamy. However, Palusamy does not disclose or suggest the features missing from Scott" (page 9) and, "In particular, neither Scott or Palusamy mentions the idea of identifying areas of high stress and focusing the monitoring on those areas". With respect to Claim 28, Applicant argues, "the cited passages of Scott do not in fact disclose or suggest updating and reanalyzing a model of the structure".

Scott et al discloses analyzing a structure using a computer model of a structure and the load data, in order to define areas which are subject to relatively high stresses (column 21, lines 31-38, lines 67-68) wherein a pipe is analyzed to determine the

locations of cracks (areas of high stress) and wherein load data is used in the analysis (column 22, lines 3-9). Scott et al teaches updating of the model through the continuous re-analysis of the structural integrity (column 10, lines 9-23; column 11, line 61-column 12, line 7), wherein the impulse response (the computer model for the structure) changes due to the changing natural frequencies of the structure. Scott et al does not disclose measuring the dimensions of a structure, such as a pipe, at these high stress areas and updating the computer model of the structure with the dimensions. The teaching of Palusamy is relied upon to show that it would be obvious to measure the dimensions of a structure, such as a pipe, at these areas of high stress and to include them in a calculation of structural integrity (column 4, lines 52-54), thereby, updating the computer model as taught by Scott et al. Since Scott et al and Palusamy are both directed to the calculation of the integrity of a structure, such as a pipe, they are therefore analogous art and it would be obvious to modify the teachings of Scott et al to include the addition of dimensions of a structure in the calculation of structural integrity.

49. With respect to Claims 31 and 32, Applicant argues, "the cited passages of Palusamy do not disclose installing sensors in high-stress areas".

It is noted that the specification does not give a specific definition for the terms "relatively high stress" or "high stress"; therefore, these terms were given the broadest reasonable interpretation. The teachings of Palusamy were interpreted to disclose installing sensors in high-stress areas wherein it was understood that the mounting of sensors where wall thickness may change quickly (column 3, lines 21-25) would encompass areas that would be under high stress, and since these measurements were

also used, along with the calculated stress at that area, to determine pipe wall integrity (column 5, lines 6-10).

50. With respect to Claim 43, Applicant argues, "none of the cited passages actually discloses measuring fluid loading".

The teachings of Scott et al are considered to encompass the limitation of the claim as recited (Scott et al: column 19, lines 4-8, 44-46; column 20, lines 19-27), wherein sensors measure wave loading on an offshore platform structure and the loading on an ocean going vessel wherein it is understood that the loading on the vessel would include the weight on the structure and the pressure exerted on the structure from the surrounding water.

51. Applicant's arguments, see page 10, filed 5/25/07, with respect to Claims 34-37 have been fully considered and are persuasive. The rejections of Claims 34-37 have been withdrawn.

Conclusion

52. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

53. Savage (US Patent 4,128,011) teaches a method for investigating and monitoring the structural integrity of structures, including the detection of changes to longitudinal dimensions.

54. Bohannan et al (US Patent 4,901,575) teaches a method for monitoring changes in structural integrity of a structural member through changes in the fundamental or harmonic frequencies in the vertical, longitudinal or lateral dimension signatures that correspond to changes in structural integrity.

55. Gerardi et al (US Patent 5,195,046) teaches a system that monitors a structure to detect disturbances and faults associated with the structure.

56. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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57. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary C. Jacob whose telephone number is 571-272-6249. The examiner can normally be reached Tuesday-Thursday, 7AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Mary C. Jacob
Examiner
AU2123

MCJ
7/25/07



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7/30/07